

HP Docket No. 10002302-1

REMARKS

Applicants appreciate the Office's review of the present application. In response to the Office Action, each one of the cited references has been reviewed, and the rejections and objections made to the claims by the Examiner have been considered. The claims presently on file in the above-identified application are believed to be patentably distinguishable over the cited references, and therefore allowance of these claims is earnestly solicited.

Claims 8, 11-12, and 21-32 stand withdrawn as being drawn to non-elected inventions. Claim 33 has been cancelled without prejudice. The specification has been amended to conform to the claim terminology. No new matter has been added.

Applicants believe that all elected claims presently on file in the subject application are in condition for immediate allowance, and such action is respectfully requested.

Restriction and Election

The Office issued a restriction requirement to elect claims of either Group I, II, or III and, if Group I were elected, to further elect one of Species I to VI. In response to the written restriction requirement, Applicants affirm the telephonic election of Group I, Species V.

Applicants respectfully request that claim 6 be designated as generic. Non-elected claims 8, 11, and 12 of Group I are directly or indirectly dependent on claim 6.

Rejections**Rejection Under 35USC Section 102(b)**

Claims 1-7, 9-10, and 17-18 have been rejected under 35 USC Section 102 (b), as being anticipated by U.S. patent 5,461,406 to Lorenze, Jr. et al. ("Lorenze"). Applicants respectfully traverse the rejection and request reconsideration based on features in the claims which are neither disclosed nor suggested in the cited reference.

As to a rejection under 102(b), "[a]nticipation is established only when a single prior

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art reference discloses expressly or under the principles of inherence, each and every element of the claimed invention." RCA Corp. v. Applied Digital Data Systems, Inc., (1984, CAFC) 221 U.S.P.Q. 385. The standard for lack of novelty, that is for "anticipation," is one of strict identity. To anticipate a claim, a patent or a single prior art reference must contain all of the essential elements of the particular claims. Schroeder v. Owens-Corning Fiberglass Corp., 514 F.2d 901, 185 U.S.P.Q. 723 (9th Cir. 1975); and Cool-Fin Elecs. Corp. v. International Elec. Research Corp., 491 F.2d 660, 180 U.S.P.Q. 481 (9th Cir. 1974).

Independent claim 1, and its dependent claims 2-7, 9-10, and 17-18, patentably distinguish over the cited reference because claim 1 emphasizes the novel features of the present invention which reduce drop placement error of main and satellite drops. In this regard, claim 1 specifies a printhead for ejecting drops of a fluid onto a medium during movement along a scanning axis, which includes:

"a plurality of chambers for controllably ejecting the drops;
a nozzle member attached to the printhead and defining a wall of each of the chambers, the nozzle member having a planar surface positionable adjacent the medium; and
a plurality of nozzles formed in the nozzle member and in fluidic communication with each chamber, wherein certain ones of the nozzles have a nozzle axis tilted along the scanning axis."

The Lorenze reference describes a printhead that "controls front face geometries" such as a "front face dicing angle" and a "thick film insulative layer etchback" in order to control an "effective meniscus tilt angle" (Abstract). Figs. 3(d), 5, and 6 of the Lorenze reference are illustrative in this regard. In Fig. 3(d), which illustrates misdirected satellite drops 46, the bore or channel of nozzle 27 is not tilted along the scanning (or process) axis, but rather is orthogonal to the plane of medium 48. In order to avoid these misdirected satellite drops, Figs. 5 and 6 illustrate how "[e]ffective meniscus tilt angles can be introduced during device processing by non-perpendicular front face dicing angles and/or etchback of the polyimide layer 18" (col. 6, line 66 to col. 7, line 2). In the Lorenze reference, the effective meniscus tilt angle is controlled within "acceptable process latitude windows for the dicing angle Θ_{DICE} and the polyimide etchback distance X_{PE} ... so that no print quality defects will occur due to

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misdirected satellite drops caused by too large of an effective meniscus tilt angle" (col. 8, lines 25-30). In other words, the effective meniscus tilt angle is controlled to avoid misdirected satellite drops by using a non-perpendicular front face dicing angle and/or polyimide layer etchback, without tilting the axis of the channel 20 of the nozzle.

Therefore, the novel features of the present invention are not anticipated by the Lorenze reference in that at least the essential element of a nozzle axis tilted along the scanning axis is absent from the Lorenze reference. Consequently, the rejection of claims 1-7, 9-10, and 17-18 is improper and should be withdrawn.

In addition, dependent claims 7 and 9 further patentably distinguish over the Lorenze reference. Claim 7 recites that "the nozzle axis is tilted between 0.2 degrees and 1.4 degrees from vertical", while claim 9 recites that "the nozzle axis is tilted between 0.4 degrees and 0.9 degrees from vertical". As explained above with respect to claim 1, the axis of nozzle channel 20 is not tilted along the scanning (or process) axis, but rather is orthogonal to the plane of medium 48. Therefore, because the novel features of claims 7 and 9 are not disclosed by the Lorenze reference, the rejection is improper and should be withdrawn

Rejections Under 35USC Section 103

Claim 13 has been rejected under 35 USC Section 103 (a), as being unpatentable over Lorenze in view of European Patent Application EP 0 835 759 A1 to Ando et al. ("Ando"). Applicants respectfully traverse the rejection and request reconsideration based on the dependence of this claim on independent claim 1, whose reasons for allowability over Lorenze have been discussed heretofore and against which Ando has not been cited.

Claim 15 has been rejected under 35 USC Section 103 (a), as being unpatentable over Lorenze in view of U.S. Patent 6,048,052 to Kitahara et al. ("Kitahara"). Applicants respectfully traverse the rejection and request reconsideration based on the dependence of this claim on independent claim 1, whose reasons for allowability over Lorenze have been

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discussed heretofore and against which Kitahara has not been cited.

Applicants further respectfully traverse the rejection and request reconsideration based on features in the claim which are neither disclosed nor suggested in the cited references, taken either alone or in combination. In this regard, claim 15 specifies a printhead wherein:

"the plurality of nozzles are grouped into a set of odd nozzles and a set of even nozzles, and wherein the nozzle axes of each of the set of odd nozzles is tilted in one direction along the scanning axis and the nozzle axes of each of the set of even nozzles is tilted in an opposite direction along the scanning axis".

Conversely, the Kitahara reference does not disclose a tilt of nozzle axes. Rather, Figs. 1 and 9 illustrate a "nozzle opening arrangement" that is analogous to the view of nozzle member 75 in Applicants' Fig. 2. Any nozzle axes of the Kitahara reference are not visible in Figs. 1 and 9 because these axes would extend into the paper. The relationship between individual nozzles in rows C and D does not define nozzle axes.

Therefore, because of the dependence of claim 15 on independent claim 1, and because the additional novel features of claim 15 are neither disclosed nor suggested by the Kitahara reference, the rejection is improper and should be withdrawn

Claims 14, 16, and 19-20 have been rejected under 35 USC Section 103 (a), as being unpatentable over Lorenze in view of U.S. Patent 5,731,827 to Mantell et al. ("Mantell"). Applicants respectfully traverse the rejection and request reconsideration based on the dependence of these claims on independent claim 1, whose reasons for allowability over Lorenze have been discussed heretofore and against which Mantell has not been cited.

With regard to claim 14, Applicants further respectfully traverse the rejection and request reconsideration based on features in the claim which are neither disclosed nor suggested in the cited references, taken either alone or in combination. In this regard, claim 14 specifies that "the nozzle axes of each of the odd nozzles and each of the even nozzles are tilted in the same direction along the scanning axis". The Mantell reference teaches that, since printheads "typically fire banks of heaters sequentially to eject ink throughout the linear array of nozzles, the printhead must be slightly tilted with respect to the scanning ... in order to stitch together printhead passes correctly" (col. 9, lines 22-26), since

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the moving printhead will be in a different location with respect to the print medium when each sequential bank is fired. Such a tilting of the printhead is different from the tilting of the nozzle axes in Applicants' invention.

Therefore, because of the dependence of claims 14, 16, and 19-20 on independent claim 1, and because the additional novel features of claim 14 are neither disclosed nor suggested by the Mantell reference, the rejection is improper and should be withdrawn

Conclusion

Attorney for Applicants has carefully reviewed each one of the cited references made of record and not relied upon, and believes that the claims presently on file in the subject application patentably distinguish thereover, either taken alone or in combination with one another.

Therefore, all claims presently on file in the subject application are in condition for immediate allowance, and such action is respectfully requested. If it is felt for any reason that direct communication with Applicant's attorney would serve to advance prosecution of this case to finality, the Examiner is invited to call the undersigned Robert C. Sismilich, Esq. at the below-listed telephone number.

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FOR THE ACCEPTANCE OF ANY NECESSARY FEES**

If any charges or fees must be paid in connection with the foregoing communication (including but not limited to the payment of an extension fee or issue fees), or if any overpayment is to be refunded in connection with the above-identified application, any such charges or fees, or any such overpayment, may be respectively paid out of, or into, the Deposit Account No. 08-2025 of Hewlett-Packard Company. If any such payment also requires Petition or Extension Request, please construe this authorization to pay as the necessary Petition or Request which is required to accompany the payment.

Respectfully submitted,



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